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JOHN D. WHITING

ARAB MASTER DRINKS DOWNSTREAM FROM A LOYAL SERVANT

It would seem almost as easy for this camel to pass through the eye of a needle as for water to pass through the long neck to its tanklike stomach. The gangling animal, though sometimes bad-tempered, is man's best friend in the Arab desertlands surrounding Palestine (Bulletin No. 1).

Bulletin No. 1, February 16, 1948

Desert Border Divides Palestine, Arab Lands

THE land borders of Palestine, which Arab troops will cross if they heed the call of Moslem leaders for a general invasion, extend for about 450 miles through country made up largely of wild desert wastes.

Starting at the south, the Arab countries which form a solid land front against the embattled Mediterranean land are Egypt, Trans-Jordan, Syria, and Lebanon. The present strife stems from Arab dissatisfaction with the United Nations plan to partition Palestine into separate Moslem and Jewish states.

Little Human Habitation

The longest all-desert boundary is to the south, where Egypt's historic Sinai Peninsula meets Palestine's Negeb Desert along a 140-mile line. On both sides extends a monotonous sand, rock, and scrub expanse, broken by occasional date-grove oases and barren hills. Now and then a sun-baked, flat-topped Arab village or a collection of nomad tents rises in the wilderness. It is a land of camels (illustration, cover) and goat's-hair tents.

In the Negeb region, a few small Jewish settlements have been established. Under the proposed Palestine partition, most of this desert triangle would be incorporated in the Jewish state for future agricultural development.

On the Sinai side of this boundary, the Egyptian authorities have already announced long-term projects for irrigation works to turn their desert into farmland, and for study and exploration looking toward development of the peninsula's potential oil and other mineral resources.

In the north, the Palestine frontiers with the Arab states of Lebanon and Syria are relatively short. The Lebanon-Palestine border extends inland from the Mediterranean for only about 35 miles. The boundary with Syria (illustration, next page) is about 45 miles. Moslem raiders recently crossed these borders to attack Dan, Palestine's northernmost town.

This northern region gives a different picture from the desert land of the south. Near the junction of the three states, Mt. Hermon raises its hoary, snow-crowned head more than 9,000 feet above sea level. Its snows feed the headwaters of the Jordan River.

Border Below Sea Level

Not far away, in a green and fertile region, lies the Biblical Sea of Galilee. Passing through this sea, the Jordan flows through a rift valley that presents one of the world's most spectacular boundary markers.

For 65 straight-line miles, the Jordan Valley drops below the earth's surface in a steep-walled depression that forms the northern half of the Palestine-Trans-Jordan border. On its way southward from Galilee, it digs itself in ever deeper, until, at the sandy, landlocked shores of the Dead Sea, it reaches the world's lowest spot.

Southward, beyond the Dead Sea, Palestine's frontier with Arab Trans-

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J. BAYLOR ROBERTS

BAFFLES ON THE SLUICE FLOOR COLLECT TIN WHILE THE WASTE WATER, SAND, AND DIRT FLOW OVER THE SPILLWAY

In Johore, southernmost of the nine sultanates included in the new Malayan Federation (Bulletin No. 5), these workers help separate the tin from its water-soaked ore. The metal is found everywhere in the Malay Peninsula—often near the surface where it can be "mined" by pick.

Bulletin No. 2, February 16, 1948

Tanganyika Coal Find May Spell Prosperity

THE recent discovery of additional coal fields in Tanganyika steps up Britain's plans for developing the resources of this east Africa territory to help the empire in postwar recovery.

Tanganyika's lack of railroads, however, is a handicap which must be remedied before the newly discovered coal deposits can be utilized. The transport system in so-called Capricorn Africa is little developed.

Railroad Links Lake Tanganyika to Ocean

The interior of the country is still a great hunting ground where roam the lion, tiger, leopard, rhinoceros, elephant, hippopotamus, and the more craftily dangerous wild buffalo.

Although ten times the size of Indiana, Tanganyika has less than a sixth of the railway mileage of the Hoosier State, and less than a third of the road mileage. Practically none of the territory's roads are hard-surfaced. Traversing the 360,000 square miles of the country are only two railroads of any appreciable length. The Central Railway crosses the country from Dar es Salaam, capital and chief port on the Indian Ocean, westward to Kigoma, a trading town on Lake Tanganyika, 675 miles as the crow flies. The much shorter Tanga line loops across the northeast corner of Tanganyika from Tanga, a port just south of the Kenya border, to Arusha, a town in the farming region near Mt. Kilimanjaro.

In spite of the lack of transport facilities, Tanganyika has long figured in world commerce. Centuries ago merchants from Greece, Arabia, India, and China began to visit this coast, trading gewgaws for the local gold, silver, ivory, and apes. Today Tanganyika's population includes more than 16,000 Europeans, and three times as many Asians. There are more than 5,000,000 natives, ranging from bow-and-arrow nomads to studious school teachers.

Along the coast dwell the Swahilis (illustration, next page), whose speech has become an official language of British East Africa.

Peanuts to Increase Vegetable Oil Output

The newly discovered coal fields, like those previously worked in Tanganyika, are in mountainous areas two hundred miles from railroads. The interior and high tableland have delayed development of the country.

To increase production of vegetable oils, peanut plantations are being expanded along the railways. Extension of at least one of the rail lines is reported likely so that the coal deposits may be worked.

Tanganyika, already one of the world's great producers of sisal, exports almost a third of the world supply of this binder-twine material. Most of this useful fiber plant is grown in the less humid sections of the coastal belt.

Gold from Tanganyika almost equals the sisal shipments in value. Silver, tin, and diamonds also are exported. Most of the natives are farmers. Produce from their small holdings, together with that from the huge plantations, adds cotton, coffee, peanuts, tobacco, hides, and tons of beeswax and copra to the country's list of exports.

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Jordan continues along the eastern edge of the Negeb Desert to the Gulf of 'Aqaba. In its entire length of about 230 miles, the Trans-Jordan boundary is the longest which any of the four Arab lands has with Palestine.

Member countries of the seven-state Arab League which do not touch Palestine are Saudi Arabia, Iraq, and Yemen.

NOTE: Palestine and the bordering Arab countries may be located on the Society's map of Bible Lands and the Cradle of Western Civilization. Write the Society's headquarters, Washington 6, D. C., for a price list of maps.

For further information, see "An Archeologist Looks at Palestine," in the *National Geographic Magazine* for December, 1947; "Palestine Today," October, 1946*; "American Fighters Visit Bible Lands," March, 1946*; "American Alma Maters in the Near East," August, 1945*; "Bombs Over Bible Lands," August, 1941; and "Bedouin Life in Bible Lands," January, 1937.* *(Issues marked with an asterisk are included in a special list of magazines available to teachers in packets of ten for $1.00.)*

See also, in the GEOGRAPHIC SCHOOL BULLETINS, "Cosmopolitan Cairo Is Arabs' Greatest City," January 19, 1948; "Palestine Division Affects Bible Landmarks," January 5, 1948; and "United Nations Proposes Palestine Partition," October 20, 1947.

G. ERIC MATSON

WADING AT THE WATERWORKS IS OUTDOOR SPORT FOR SYRIAN YOUNGSTERS AT HAMA

Water for gardens and a mosque in the old Syrian city is scooped from the Orontes River by the largest waterwheel in the world. Built of wood on an iron axle, it is 70 feet in diameter. The river's current, flowing against paddles set on the wheel, turns the giant disk. Buckets on the rim dip up the water. The pebbly shallows provide a cool playground for the children.

Bulletin No. 3, February 16, 1948

Windless Waves Mystify Seafarers

FOR the men who "go down to the sea in ships," the oceans still have their baffling mysteries in winds, waves, and weather, despite all the scientific progress in plumbing its secrets.

The North Atlantic amazed a veteran skipper recently by producing giant "dead" waves in a windless area. It was a phenomenon he had never encountered in 35 years at sea. Weather experts speculate the area might have been the meeting place of two converging storms. In such cases, a "dead" section may occur in the center, where winds have subsided but turbulent seas continue.

Ocean Floor Erupts, Collapses

But causes for weather are almost invariably variable. If the Atlantic's big waves, estimated at 40 feet, had occurred within the earthquake belt of the Pacific, an equally logical explanation could have been a submarine volcanic explosion.

Marine history is full of tragic happenings (illustration, next page) for which no explanation can be found in weather or other known conditions. Some of the ships which have disappeared without trace may have been caught too near the spot of an undersea eruption. Others may have been in the neighborhood of a sudden collapse in the ocean floor and been sucked down through a vortex of waves.

One unsolved event in clear weather concerned a fishing ship a century ago. Returning from a trip, this ship anchored off Cape Cod, while her captain and all the crew made for port in a small boat. The distance was only half a mile, and some of the men were noted for their swimming ability. Yet only the empty boat reached shore, followed, one after another, by the bodies of the men.

Most waves, from the gentlest ripple to the mighty troughs of mid-ocean, are caused by the intermittent, gusty action of the winds. The mathematically inclined have worked out a definite ratio, depending on general physical conditions, between wind velocity and the length and height of waves.

Waves Do Not Move Water

Sometimes, however, as in the case of the recently reported North Atlantic incident, waves are most violent in the calmer spaces of a storm where no winds are present. This apparent inconsistency is matched by the fact that gale winds may also act as a restraint on the waves, cutting off their crests and dispersing these tops in spray.

Contrary to the superficial impression, too, waves do not carry the water along with them. A wave is actually a traveling disturbance along the sea's surface, by which individual particles of water are stirred and shifted about but not moved forward.

This can be easily seen in the up-and-down and generally circular motion of a bit of wreckage.

Lava from ancient volcanoes has become productive soil over most of the interior of Tanganyika. But the hilly tableland is badly eroded by mountain streams in many places, and large sections are arid. Vast swamps pockmark the highlands.

Though the northern tip of Tanganyika almost touches the Equator, a constant breeze from the Indian Ocean tempers the coastal areas. The central plateau, 2,000 to 4,000 feet above sea level, is often dry and hot. Mountainous areas are cool and invigorating, the nights often cold. Mt. Kilimanjaro, rising nearly 20,000 feet near the Kenya border, is the highest mountain in Africa.

NOTE: Tanganyika is shown on the Society's map of Africa.

For additional information, see "British Commonwealth of Nations," in the *National Geographic Magazine* for April, 1943; and "When a Drought Blights Africa," April, 1929; and, in the GEOGRAPHIC SCHOOL BULLETINS, March 17, 1947, "Africa's Sukumaland Tries Self-Government"; and "British Bases in Kenya and Tanganyika," Nov. 4, 1946.

F. J. KOCH

SHIP-TO-SHORE TRANSPORT GIVES A SWAHILI WOMAN POSTURE THAT A FASHION MODEL MIGHT ENVY

Head erect to hold the huge jar, and shoulders squared to bear its weight, this Swahili woman carries her burden ashore through the shallows from a small boat. Exercise that is all in her day's work gives her a stately carriage and a figure which displays to advantage an off-shoulder gown. The Swahilis are a mixture of Negro and Arab.

Bulletin No. 4, February 16, 1948

France Starts "TVA" System with Rhône Dam

THE new Genissiat dam is the first of twenty with which France proposes to harness the Rhône River. This vast development is expected to rival in power production America's Tennessee Valley Authority.

France has planned hydroelectric plants on a large scale to supplement the inadequate output of the country's coal mines. These now supply only half the amount the nation needs. The power generated by the Genissiat plant alone is expected to equal that which two million tons of coal could produce annually.

Genissiat Power to Light Up Paris

The Genissiat dam rises 340 feet between cliff walls, five miles below Bellegarde, in eastern France. Though 14 United States dams are higher, it is Europe's second-largest. Its water will generate more than one and one-half billion kilowatt-hours a year for the electrification of the country's industries and railroads.

A ten-per-cent electrification of France's 25,000 miles of railway has already cut imports of coal by more than 2,000,000 tons annually.

Some of the power from the Genissiat dam is earmarked for Paris. The boulevards and cafes of the French capital will owe much of their brilliance to the 250 Alpine glaciers whose melting snows in spring discharge 35,000 cubic feet of water into Lake Geneva (Lac Léman) every minute.

The lake, through which the Rhône flows for 45 miles (illustration, next page), has an area of 223 square miles and impounds some of the flood waters of the melting snows from the surrounding mountains. From the lake's 1,200-foot elevation, the Rhône drops 350 feet in 30 miles.

Rising in the Canton of Valais in southern Switzerland, the river flows in a southwesterly direction. At Martigny, a little over 100 miles from its source, it makes a right-angle turn to flow northwest into Lake Geneva. Martigny's monastery supplies details of monks to serve as guards at the Great St. Bernard Hospice, 17 miles to the south.

Rhône Valley Farms Feed Foreign Visitors

The Rhône is one of Europe's principal rivers. In its 505-mile course from the Alps to the Mediterranean, it drops nearly 6,000 feet.

Three widely different types of scenery characterize the Rhône Valley. First, the river is joined by numerous torrential streams. Wild gorges cut its banks. Then the valley broadens. Framed by lofty mountains, it lies like a carpet, patterned with cornfields and orchards. Green pasturelands support herds of cattle, foundation of Switzerland's famous dairy industry. Truck gardens grow vegetables for hundreds of hotels. In spite of wars and depressions, these hostelries for generations have drawn travelers to Switzerland from all over the world.

Finally, in France, the Rhône's course leads through the busy industrial region of which Lyon, world-famous silk center, is the chief city. It flows south past Roman ruins and ancient medieval castles, under the old stone bridge at Avignon—celebrated in a French song—and on to enter the Mediterranean at Marseille.

There are even waves beneath the surface. When fresh water from a river, or from melting ice, mingles with the salty ocean, layers form. A stirring occurs between the liquid layers, causing internal waves which can slow a ship's progress. In days of sail, vessels retarded in this way, in spite of favorable winds, were said by their skippers to be in "dead" seas.

Mariners still pour oil on troubled waters to prevent the formation or to break the rhythm of waves. This practice is especially helpful in lowering boats over the side on the high seas, for towing operations, and for safety when at anchor.

NOTE: For additional information, see "American Pathfinders in the Pacific," in the *National Geographic Magazine* for May, 1946*; "They Survived at Sea," May, 1945*; and "Our Global Ocean—Last and Vast Frontier," January, 1945*.

METROPOLITAN MUSEUM OF ART

"OLD OCEAN'S GRAY AND MELANCHOLY WASTE" TRAPS ANOTHER VICTIM

Winslow Homer's painting, "The Gulf Stream," captures the helplessness of man at the mercy of the vast and lonely sea. A would-be rescue ship passes unnoticed in the distance (left) as sharks close in. The mastless sloop will drift to a distant shore or, becoming waterlogged, will sink to the ocean bottom to join other unexplained mysteries of the sea. At the right, a waterspout swirls to add to the castaway's peril.

Bulletin No. 5, February 16, 1948

Malayan Federation Is Rubber and Tin Land

THE Federation of Malaya, now virtually independent of Great Britain, is a country with economic foundations deep-set in rubber and tin.

Before the war, British Malaya produced nearly half the world's rubber, mined almost two-fifths of its tin (illustration, inside cover), and was wealthier than the rest of the British colonies (not dominions) put together. Today, rubber production in the southeast Asia peninsula is breaking prewar records, but tin supplies are currently down because accumulated wartime stocks have been depleted.

Malays Leave Main Industries to Others

The new Malayan Federation, launched as a going concern by the British governor of Kuala Lumpur on February 1, includes all British Malay Peninsula possessions and adjacent islands except Singapore, which will remain a crown colony. The bulk of the federation is in nine variously developed native sultanates—the small protectorates that fell one by one to the Japanese as they swept through the jungles to Singapore in 1942.

Strangely enough, the native Malays have little or nothing to do with the two cornerstone industries of their country. Most rubber and tin enterprises are owned by British or Chinese firms. Chinese immigrants (illustration, next page) even hold most of the laboring jobs in the tin mines. When labor was needed for expanding rubber plantations after the turn of the century, Tamils from southern India were brought in. Malays own and work many small rubber groves.

Chinese and Indians together slightly outnumber the Malays in the Arkansas-size country. Though sparsely settled compared with China and India, the federation has a total population of 5,000,000—more than double that of the Razorback State.

Malays are farm- and fisher-folk who naturally take to the sea. They live in villages of wooden houses perched on stilts, often near or over water. They grow rice in irrigated paddies. The individual Malay is a cheerful, proud, dignified man who elevates good manners and social ceremony above everything. He works hard when a job captures his interest, but otherwise nature is bountiful enough to make drudgery unnecessary.

Penang Was English Toe Hold

An airplane flight over the peninsula reveals how little nature has been disturbed. Solid jungle blankets the hot and humid land except for occasional patches in the eastern part and ribbons following the central and western railroads. Most rubber and tin development has occurred on the Strait of Malacca side, along the Singapore-to-Penang railway.

Arabs, Portuguese, and the Dutch preceded England in trading with and colonizing the Malay Peninsula. The island of Penang was England's first possession in the region, acquired at about the time she lost the thirteen American Colonies. Singapore was founded in 1818 and the Portuguese port of Malacca was finally taken over in 1824.

From these coastal points, known collectively as the Straits Settle-

UMI

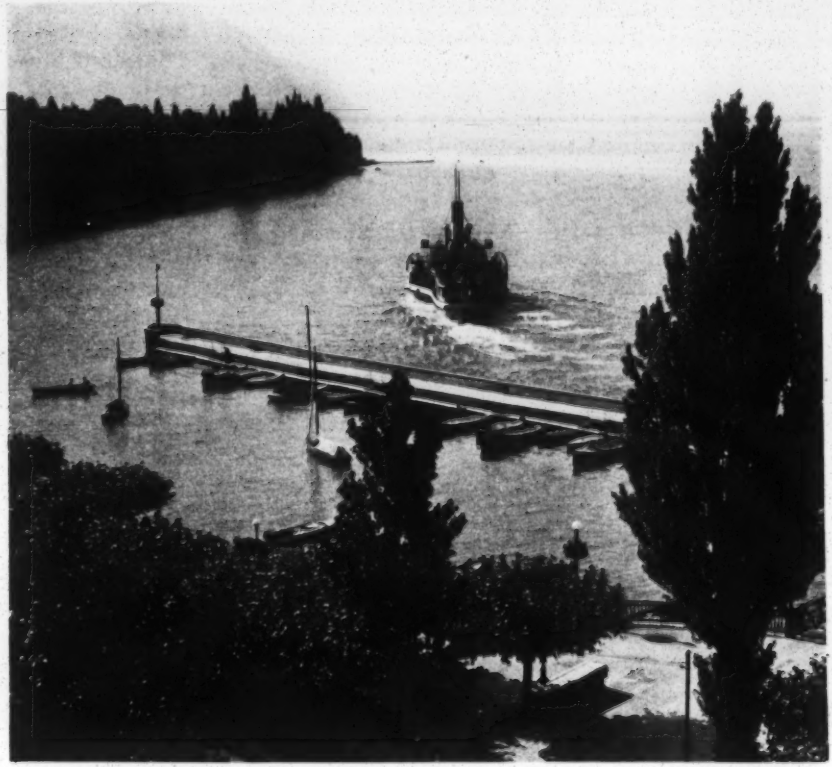
Work on the second Rhône River dam at Seyssel, 20 miles south of Genissiat, was begun late in 1946. Its construction is expected to take four years. When it is completed, this second unit of the system will deliver an additional 200,000 kilowatt-hours yearly.

The Rhône development picks up the hydroelectric program which France pushed between 1926 and 1933. Then large power plants were erected on the Dordogne River and its tributaries flowing from the Massif Central west of the Rhône. These plants increased France's power supply by 60 per cent.

The Rhône River development is expected to further increase the nation's production of hydroelectric power by one-third.

NOTE: The upper reaches of the Rhône may be traced on the Society's map of Germany and Its Approaches; the lower course is shown on the map of Central Europe and the Mediterranean.

See also, "Lake Geneva: Cradle of Conferences," in the *National Geographic Magazine* for December, 1937.



BERNARD F. ROGERS, JR.

THE RHÔNE RIVER'S WATERS POUR INTO AN ALPINE VALLEY TO FORM LAKE GENEVA

A squat sidewheel steamer heads away from Vevey's tree-shaded terraces to circle the Rhône-fed lake. A few miles around the wooded point (left) the Castle of Chillon rises from its rock base off shore. François de Bonivard, hero of Lord Byron's poem, "The Prisoner of Chillon," which brought fame to the ancient castle, was born at Seyssel where France is building its second Rhône dam. Vevey is the center of a grape-growing region and miles of vineyards climb the surrounding hill slopes. About every 20 years, the town is the scene of a gala festival, The Vintners' Fete. At Vevey, popular both as a summer and a winter resort, begins Switzerland's "Riviera." Spacious hotels and private villas rim the shores to the lake's easternmost point.

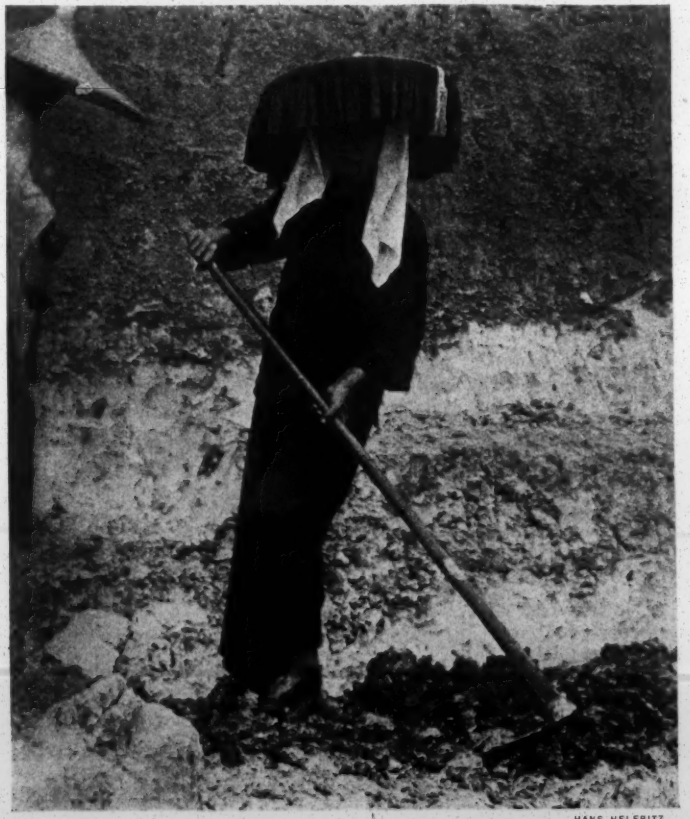
ments, British influence spread inland and put a halt to the continuous warfare among the petty sultanates. Treaties were signed with each sultan. With orderly government, sea piracy died out. Armed brigands and Chinese tin-miners could no longer roam at will over the land.

In 1895, four of the more developed sultanates—Perak, Selangor, Negri Sembilan, and Pahang—were grouped in The Federated Malay States. Johore, Kedah, Perlis, Trengganu, and Kelantan were known as the Unfederated Malay States. These prewar designations, along with the Straits Settlements, are no longer used.

The Arabs made Mohammedans of the Malays in 1276, but even today the old belief that everything has its own spirit is more evident than bowing toward Mecca. When hunting, the Malay explains to the spirit of the animal to be killed that the gun is responsible. Before driving piles into the ground for a new house, he asks forgiveness of the soil spirit.

NOTE: The region occupied by the Federation of Malaya may be located on the Society's map of Southeast Asia.

For additional information, see "Tin, the Cinderella Metal," in the *National Geographic Magazine* for November, 1940; and, in the GEOGRAPHIC SCHOOL BULLETINS, April 29, 1946, see "Penang, Glamorous Malayan Island, Resumes Tin Smelting"; and "Piracy, Like History, Repeats Itself in Malaya," November 12, 1945.



HANS HELFRITZ

WITH THE FRINGE ON TOP, A CHINESE WOMAN TIN-MINER BEATS THE MALAYAN HEAT